WisDOT RD&T Home

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Putting Research to Work

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Technical information for state DOT highway professionals
Prepared by CTC & Associates LLC

Designing for the Future

Arizona DOT Heads Underground to Reduce Congestion

To eliminate 4- and 5-minute waits at traffic lights on busy Grand Avenue in Glendale, Arizona DOT will turn seven 6-way intersections into 4-way intersections along a 12-mile stretch of the road. At one intersection, Grand Avenue will be recessed for a half-mile, leaving the bridge at grade. The bridge, which will become a gateway to historic downtown Glendale, will include brick pavers, landscaping, and transit and pedestrian facilities. Construction began in May; see the project Web site at http://www.grandimprovements.com/project-information.php.

Award-Winning Rochester, N.Y., Bridge Melds Past and Present

Rebuilt as part of construction of a new bascule bridge over the Genesee River, the Latta Road highway bridge in Rochester combines contemporary structure with design elements reminiscent of stonework in local landmarks. Blending easily into an area rich with early New York stone structures and Ice Age outcroppings, the bridge won New York State DOT an Engineering Excellence Award last month from the American Council of Engineering Companies of New York. See the press release at http://www.dot.state.ny.us/news/awards/50205.shtml, and view a construction photo at http://www.ororkebridge.com/images/apr03/full/apr03_6.jpg.

Integrated Highway Design Protects River, Wildlife

The Vermont Agency of Transportation rebuilt a 3.7-mile section of VT Route 9 with minimal impact on wildlife, endangered plants and the adjacent Deerfield River while widening and straightening sections of the highway to reduce the number of accidents. Finely textured fill was used under the four new bridges to encourage wildlife to cross away from traffic, and steep slopes that required clearing were stabilized with rock and native soil to encourage quick plant regeneration. This integrated approach won the agency a 2004 Public Space Honor Award. See the press release at http://www.aot.state.vt.us/VTransReceivesPublicSpaceAward.htm.

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Minnesota DOT Research Newsletter: http://www.research.dot.state.mn.us/newsletter.cfm
Austroads Newsletter from Austroads: http://www.austroads.com.au/austroads_newsletter.html.
Transportation Communications Newsletter: http://groups.yahoo.com/group/transport-communications/.

Construction and Materials Innovations

Overlay Releases Deicer When Wisconsin Bridge Needs It

An anti-icing overlay on a Wolf River bridge in Crandon, Wis., has cut the number of magnesium chloride applications on the bridge in half. Called SmartLane, the overlay consists of an epoxy-aggregate layer that absorbs deicing liquid and releases it when frost conditions strike. It reduces runoff, protects the bridge structure from deicers, and seems resistant to snow plow damage. The overlay reportedly requires little surface preparation and can last up to 15 years. See the article in *Better Roads* at http://www.betterroads.com/articles/may05c.htm.

WisDOT's Mississippi River Bridge Named 'Top Project'

The $31 million, four-lane Mississippi River bridge on US 14/61 in La Crosse was named a "Top Project of 2004" by *Wisconsin Builder* magazine. Among the project's engineering feats was the floating of the 475-foot-long, 2.8 million-pound steel arch to its piers from the downstream barges where it was constructed. Planned with help from the U.S. Coast Guard and the U.S. Army Corps of Engineers, the task was orchestrated by the Lunda Construction Company of Black River Falls to a 4-inch clearance. The bridge opened in November. Read the *Wisconsin Builder* article at http://www.wibuilder.com/tp-2004/barging-through.html, and see the WisDOT press release at http://www.dot.wisconsin.gov/news/news/5/2005/mississippibr.htm.

WisDOT Bridge Makes History with FRP Grid Technology

A WisDOT bridge on the US 151 bypass in Fond du Lac is the first concrete bridge in the country to use internal three-dimensional fiber-reinforced polymer grids for reinforcement. Developed by UW-Madison researcher Larry Bank, the new system replaces the use of steel and epoxy-coated bars. The system shortens construction time considerably and offers corrosion-free support, promising to extend bridge deck life by decades. See the press release at http://www.news.wisc.edu/11233.html.

Contractor Looks Within to Fix Failing Box Culvert

When WisDOT inspectors found severe cracking and impending failure of a box culvert at the US 18 bypass in Verona, contractor Edward Kraemer & Sons of Plain executed an elegant solution: It placed a new culvert within the old. Without disturbing traffic, workers installed 210 sections of precast, wire-mesh-reinforced concrete culvert, each 11 feet by 3 feet 5 inches and weighing 24,000 pounds. Read the article in *Western Builder* at http://www.acppubs.com/article/CA515809.html, and see pictures at Edward Kraemer's Web site at http://www.edkraemer.com/news/news_detail.asp?id=133.

Foamed Asphalt Base Put to the Test in Georgia

Foamed asphalt base stabilization, in which hot foamed binder is mixed with reclaimed asphalt pavement, continues to gain popularity across the country. Roswell, Ga., an Atlanta suburb, has over the last four years successfully used foamed asphalt on four highly traveled roads. The process involves injecting water into hot liquid asphalt to create foam; special equipment then mixes the foamed asphalt binder with reclaimed asphalt pavement. Several research projects are currently studying the technique for use in cold in-place rehabilitation. See the article in *Public Roads* at http://www.tfhrc.gov/pubrds/05mar/04.htm.

Precast Concrete Fast-Tracks New York City Bridge

The use of precast concrete in bridge construction continues to benefit from research and practice. New York City DOT's Belt Parkway Bridge in Brooklyn was finished 29 days ahead of its already accelerated schedule; the contractor precast and preassembled 51 steel and concrete bridge components for use on the project, which was completed in 261 days. The cutting-edge span also employed 400,000 pounds of stainless steel rebar, an expansion-joint-free design. Read the article in *Concrete Monthly* at http://www.concretemonthly.com/monthly/art.php/1415. Ontario, Canada, also trumpets the technology for work on a bridge project that will cut two months off its schedule; see http://www.pir.gov.on.ca/userfiles/HTML/cma_4_42060_1.html.

Pavement Conference Highlights Success in Chip Sealing

An article in the Center for Transportation Studies' Technology Exchange newsletter details a February talk by Minnesota DOT's Jerry Geib about chip sealing. Geib echoes a presentation at the 2005 TRB Annual Meeting by Douglas Gransberg, proposing use of one-stone-thick layers for chip sealing, with aggregate strictly uniform in size and shape. The presentation also recommends the use of polymer-modified binders, and control of emulsion content to the hundredths of gallons. See http://www.mnltap.umn.edu/publications/exchange/2005-2/2005-2-4-1.html.

Operating/Optimizing the System

Intelligent Traffic Control System Reduces Delays

Researchers at the Texas Transportation Institute have developed and field-tested a traffic control system that detects a group of motorists and keeps it moving through traffic signals. TTI tested the Platoon Identification and Accommodation System in a suburban setting with two-lane high-speed traffic, turn bays and a nearby railroad crossing, as well as on a busier four-lane highway. See TTI's project summary at ftp://ftp.dot.state.tx.us/pub/txdot-info/rti/0-4304-s.pdf.

MnPass Puts Minnesota Motorists in the Fast Lane

Minnesota DOT rolled out a new way to relieve congestion on Minneapolis-St. Paul roadways last month. Solo motorists who want to avoid being stuck in traffic can hit the high-occupancy vehicle lanes, but they've got to pay to play. Collected electronically through in-vehicle transponders, tolls for using the lanes vary with traffic levels—up to $8 if conditions warrant it. Car pools, motorcycles and buses can still use the lanes for free. The idea caught on quickly: By MnPass' first day, about 3,400 motorists had transponders in their cars. Read the press release at http://www.dot.state.mn.us/newsrels/05/05/16mnpass.html, and a *USA Today* article at http://www.usatoday.com/news/nation/2005-05-08-hot-lanes_x.htm.

Michigan Agencies Cooperate to Clear Ice, Snow

Six years after four Michigan agencies joined forces to combat Old Man Winter, the Southeast Michigan Snow and Ice Management system continues to work toward developing an Automatic Vehicle Location system that would allow the partners to clear roads of snow and ice cooperatively. The SEMSIM AVL system is the largest in the country. It tackled its fifth season, the winter of 2003-2004, with a fleet of vehicles 292-strong. A report details SEMSIM's fifth season and includes AVL system benefits and concerns; see http://www.itsdocs.fhwa.dot.gov//JPODOCS/REPTS_TE//14116.htm.

FHWA Sizes Up Best RWIS Sensor Placements

In an effort to help DOTs make the most of Road Weather Information Systems, an FHWA report brings together published research on placing weather and pavement sensors, and includes interviews with nearly two dozen road weather authorities. Based on the research and expert testimony, this report shows that uniform placement of RWIS collection components can, among other benefits, provide valuable data to improve the comparison and integration of road weather information with other meteorological data. See http://www.ops.fhwa.dot.gov/publications/ess05/index.htm.

UDOT Looks to Goats for Weed Control

Utah DOT has taken an unusual approach to controlling noxious weeds in its 2,098-acre Legacy Nature Preserve—goats. UDOT has put 750 of the animals to work chewing up the flowering portions of the invasive weeds, crushing about 99% of the seeds as they chew. The Legacy Preserve project is an environmental mitigation effort for the proposed 14-mile Legacy Parkway. Once both are in place, they will serve to curtail intrusive development along the eastern shore of the Great Salt Lake. See the press release at http://www.sr.ex.state.ut.us/index.php/m=c/tid=64/item=14524/d=full, and read more about the Legacy Parkway and Preserve at http://www.sr.ex.state.ut.us/index.php/m=c/tid=181.

Low-Profile Concrete Barrier Improves Work Zone Visibility

Florida DOT expects to begin using a new low-profile concrete barrier next year in work zones with posted speeds of 45 mph or less. The barrier was designed by University of Florida engineers to provide less expensive, easier-to-align buffers at highway construction sites. The barriers also improve driver visibility, making travel through construction zones safer for motorists. Read more in *Public Roads* at http://www.tfhrc.gov/pubrds/05mar/alongroad.htm (scroll to “Technical News”).

Safe Travel/Smart Travel

Wisconsin’s High-Tech Weigh Station

A newly renovated weigh station on I-94 in southern Wisconsin links an advanced weigh-in-motion screening system to a static scale with a unique feature called Automatic Violation Check and Release, which reduces the amount of time required to statically weigh trucks. The new system will increase operating efficiency and throughput at the station while contributing to safer motoring along the Interstate. Read more in *Transportation Management + Engineering* at http://www.tmemag.com/tme/index.cfm?powergrid=rfah=|cfap=&CFID=3673820&CFTOKEN=38939058&fuseaction=showArticle&appDirectory=tme&articleID=5970.

Innovative Rail Warning System Discourages Risky Driving

In suburban Baltimore, a “second train coming” warning system using flashing, animated dynamic message signs was installed to discourage drivers from crossing the tracks between two trains approaching in quick succession. After the system was installed, the most common type of risky behavior at the crossing decreased by 26%. See the U.S. DOT ITS Benefits Database at http://www.benefitcost.its.dot.gov/its/benecost.nsf/ByLink/BOTM-May2005.

Weather Station Will Support Traffic Research

A sophisticated weather station being installed at the Turner-Fairbank Highway Research Center will gather data to support FHWA research on road weather management and weather information systems for highway applications. The new weather station will be used in research on traffic simulation models and work on communication and data exchange between vehicles and the roadside. Read more in *Research & Technology Transporter* at http://www.tfhrc.gov/trnsptr/mar05/index.htm#new.

GPS in the Driver's Seat

A federally funded research project is examining a high-tech solution to roadway congestion in which traffic is tracked through GPS devices in cars that are connected wirelessly. Drivers in the pilot project essentially act as highway probes, receiving continual feedback from in-car computers intoning commands. Read more in the *Rocky Mountain News* at http://www.rockymountainnews.com/drmn/technology/article/0,1299,DRMN_49_3780550,00.html.

High-Tech Parking Signs

A new "way-finding" sign system being developed for Des Moines will provide drivers with real-time information on parking availability in city ramps. As the system simplifies life for drivers, it is also expected to cut traffic congestion and vehicle emissions in the downtown area. Read more at Radio Iowa at http://www.radioiowa.com/gestalt/go.cfm?objectid=396039B6-42FD-453D-8CB216D5BC0189D2.

Deterring Wrong-Way Drivers

Intelligent Perimeter Systems has unveiled a safety system designed to detect and deter vehicles attempting to enter a roadway from the wrong direction or at a restricted time. The system is also designed to alert law enforcement via radio, cellular or satellite signals. Read the press release at http://www.ttnews.com/industryannounce/indfeeds2.asp?feed=529262XSL_NEWSML_TO_NEWSML_LINKS.xml.